

ABSTRACT OF THE INVENTION

PROTECTING IMAGES WITH AN IMAGE WATERMARK

A robust means of watermarking a digitized image with a highly random sequence of pixel brightness multipliers is presented. The random sequence is formed from 'robust-watermarking-parameters' selected and known only by the marker and/or the marking entity. A watermarking plane is generated having an element array with one-to-one element positional correspondence with the pixels of the digitized image being marked. Each element of the watermarking plane is assigned a random value dependent upon a robust random sequence and a specified brightness modulation strength. The so generated watermarking plane is imparted onto the digitized image by multiplying the brightness value or values of each pixel by its corresponding element value in the watermarking plane. The resulting modified brightness values impart the random and relatively invisible watermark onto the digitized image. Brightness modulation is the essence of watermark imparting. Detection of an imparted watermark requires knowing the watermarking plane with which the watermark was imparted. Regeneration of the watermarking plane requires knowledge of the robust-marking-parameters used in its formulation. This is generally only known to the marker and/or marking entity. Once regenerated, the watermarking plane is used together with a verifying image located in a 'visualizer' to demonstrate the existence of the watermark. The process of watermark detection is enhanced by application of a blurring filter to the marked image before detection is attempted.